We claim:

1. A passivating overcoat bilayer for a multilayer reflective coating designed for use in extreme ultraviolet or soft x-ray applications, comprising:

a bottom overcoat layer affixed to a top layer of a multilayer reflective coating; and

a top overcoat layer deposited on said bottom overcoat layer, wherein said bottom overcoat layer comprises material that prevents diffusion of said top overcoat layer into said top layer of said multilayer reflective coating, wherein said top overcoat layer comprises material that resists oxidation and corrosion and protects said multilayer reflective coating from oxidation.

2. The overcoat bilayer of claim 1, wherein said bottom overcoat layer comprises boron carbide.

3. The overcoat bilayer of claim 1, wherein said bottom overcoat layer comprises molybdenum.

4. The overcoat bilayer of claim 1, wherein said bottom overcoat layer comprises carbon.

5. The overcoat bilayer of claim 1, wherein said bottom overcoat layer comprises a plurality of components.

6. The overcoat bilayer of claim 1, wherein said bottom overcoat layer comprises a plurality of layers.

7. The overcoat bilayer of claim 1, wherein said top overcoat layer comprises ruthenium.

8. The overcoat bilayer of claim 1, wherein said top overcoat layer comprises material selected from the group consisting of Zr, Rh and Pd.

9. The overcoat bilayer of claim 1, wherein said top overcoat layer comprises a plurality of components.

10. The overcoat bilayer of claim 1, wherein said top overcoat layer comprises a plurality of layers.

11. The overcoat bilayer of claim 1, wherein said bottom overcoat layer comprises about 1.3 nm of Mo and wherein said top layer comprises between 0.6 nm and 2 nm of Ru.

12. The overcoat bilayer of claim 1, wherein said bottom overcoat layer comprises B_4C, wherein said top layer of said multilayer coating comprises silicon.

13. The overcoat bilayer of 6, wherein the thickness of said bottom layer is combined with said top layer of said multilayer coating.

14. The overcoat bilayer of claim 1, wherein said top overcoat layer and said bottom overcoat layer of said overcoat bilayer have optimum thicknesses selected such that the bilayer overcoat is phase-matched with the underlying multilayer coating.

15. The overcoat bilayer of claim 1, wherein said top overcoat layer and said bottom overcoat layer have thicknesses, wherein the thickness of said top overcoat layer is selected to protect the underlying layers from oxidation,

and wherein the thickness of the bottom layer is selected such that the bilayer overcoat is phase-matched with the underlying multilayer coating.

16. The overcoat bilayer of claim 1, wherein said top overcoat layer and said bottom overcoat layer have thicknesses that are optimized to maximize the normal incidence reflectance at an operating wavelength of less than about 15 nanometers.

17. The overcoat bilayer of claim 1, wherein said top overcoat layer has a thickness ranging from about 0.5 nanometers to about 7 nanometers.

18. The overcoat bilayer of claim 1, wherein said bottom overcoat layer has a thickness ranging from about 0.5 nanometers to about 7 nanometers.

19. The overcoat bilayer of claim 1, wherein said multilayer reflective coating comprises a plurality of pairs of underlying layers, and the underlying layers have a reflectance greater than about 65% at an operating wavelength of less than about 15 nanometers.

20. The overcoat bilayer of claim 19, wherein each underlying pair of layers of said underlying layers comprises a first layer comprising silicon and a second layer comprising molybdenum.

21. The overcoat bilayer of claim 19, wherein each underlying pair of layers of said underlying layers comprises a first layer comprising beryllium and a second layer comprising molybdenum.

22. The overcoat bilayer of claim 1, wherein said overcoat bilayer and said multilayer reflective coating have a normal incidence reflectivity of at least about 65% at an operating wavelength of less than about 15 nanometers, and wherein said multilayer reflective coating comprises silicon and molybdenum.

23. The overcoat bilayer of claim 1, wherein said overcoat bilayer and said multilayer reflective coating have a normal incidence reflectivity of at least about 65% at an operating wavelength of less than about 15 nanometers, and wherein said multilayer reflective coating comprises beryllium and molybdenum.

24. A method for forming a passivating overcoat bilayer for a multilayer reflective coating designed for use in extreme ultraviolet or soft x-ray applications, comprising:

providing a multilayer reflective coating;

depositing on said multilayer coating a bottom layer comprising material that will reduce or prevent interdiffusion; and

depositing on said bottom layer a top layer comprising material that resists oxidation and corrosion and protects said multilayer reflective coating from oxidation.

25. The method of claim 24, wherein said bottom layer comprises B_4C.

26. The method of claim 24, wherein said bottom layer comprises Mo.

27. The method of claim 24, wherein said top layer comprises Ru.

28. The method of claim 24, wherein the deposition of the bottom layer or the top layer is carried out by vapor phase deposition.

29. The method of claim 24, wherein the thickness of the top layer is controlled by intentional oxidation of said bottom layer.

30. The method of claim 24, wherein said bottom layer comprises carbon.

31. The method of claim 24, wherein said bottom layer comprises a plurality of components.

32. The method of claim 24, wherein said bottom layer comprises a plurality of layers.

33. The method of claim 24, wherein said top overcoat layer comprises a plurality of components.

34. The method of claim 24, wherein said top overcoat layer comprises a plurality of layers.

35. The method of claim 24, wherein said top overcoat layer comprises material selected from the group consisting of Zr, Rh and Pd.